

The Report of the  
GAIN/LOSS ANALYSIS OF FINANCIAL EXPERIENCE  
During calendar 1979 and 1980  
CITY OF MOORHEAD  
FIRE DEPARTMENT RELIEF ASSOCIATION  
Moorhead, Minnesota

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June 17, 1981

City of Moorhead  
Fire Department Relief Association  
Moorhead, Minnesota

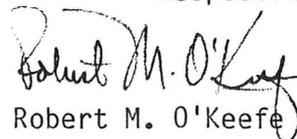
Submitted in this report are the results of the 1979-80 gain/loss analysis of the financial experiences of the Moorhead Fire Department Relief Association.

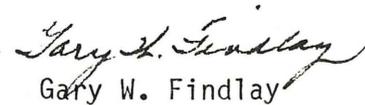
The composite results of this study are reported on Schedules 1(A) and 1(B) and comments regarding the results are on page 12.

The gain/loss analysis was based upon statistical data furnished by the Association regarding active and retired member changes and related financial transactions.

The actuarial assumptions used for regular valuation purposes and which produce "expected" experience data are shown in the appendix of this report.

Respectfully submitted,

  
Robert M. O'Keefe

  
Gary W. Findlay

## PURPOSE OF GAIN/LOSS ANALYSIS

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Actual financial experience will not coincide exactly with assumed financial experience--differences are to be expected since the future cannot be predicted with absolute precision. The changes in computed liabilities resulting from differences between actual and assumed experiences are called actuarial gains if the experience was financially favorable and actuarial losses if the experience was financially unfavorable. Actuarial gains result in decreases in contribution rates and actuarial losses result in increases.

Regular actuarial valuations provide information about aggregate computed liabilities. However, regular valuations do not develop the information needed to explain the year to year changes in computed liabilities attributable to each activity within the retirement system financial mechanism. The purpose of a gain/loss analysis is to determine the change in computed liabilities and contribution rates attributable to variations between actual and assumed experience.

Once a difference between actual and assumed experience in a risk area has been observed to be sizeable and persistent, the assumed experience should be changed to reflect the observed reality. However, gains and losses over a relatively short period of time may not be indicative of long term trends which provide the basis for selection of actuarial assumptions.

## ACTIVITY WHICH RESULTS IN GAINS OR LOSSES

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### Age & Service Retirement.

If members retire at older ages than assumed, there is a gain. If retirements occur at younger ages than assumed there is a loss.

### Disability & Death-in-Service.

If casualty claims are less than assumed, there is a gain. If there are more casualty losses than assumed, there is a loss.

### Withdrawal.

If more liabilities are released by withdrawal than assumed, there is a gain. If there are fewer withdrawals than assumed, there is a loss.

### Salary Increases.

If there are smaller salary increases than assumed, there is a gain. If salary increases are greater than assumed, there is a loss.

### Investment Income.

If there is greater investment income than assumed, there is a gain. If investment income is less than assumed, there is a loss.

### Post Retirement Mortality.

If benefit recipients die at younger ages than assumed, there is a gain. If they live longer than assumed, there is a loss.

### Contribution.

Gains or losses arise due to the delay in implementing changes in the recommended contribution.

### Miscellaneous.

Miscellaneous gains and losses include changes due to data adjustments, rounding and changes in the average age and service characteristics of the group.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 1(A)

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1979

Type of Activity	Accrued Liabilities (Gain) or Loss		Contribution Requirements (Gain) or Loss	
	Active Members (\$ in 1,000)	Retirants & Beneficiaries (\$ in 1,000)	Normal Cost % of Payroll (\$ in 1,000)	\$ Payment on UAL
<u>Age &amp; Service Retirements</u>	\$ 0	\$ N/A	N/A	\$0.00
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(3.4)	N/A	N/A	(0.17)
b. <u>Death-in Service</u>	2.9	N/A	N/A	0.14
<u>Withdrawal</u>	(16.4)	N/A	N/A	(0.80)
<u>Salary Increases</u>	79.7	0.0		3.89
<u>Investment Income</u>	(14.5)	(6.5)		(1.02)
<u>Post Retirement Mortality</u>	N/A	6.8	N/A	0.33
<u>Contributions</u>	34.6	24.1		2.86
<u>Miscellaneous</u>	<u>0.2</u>	<u>(0.5)</u>	—	<u>0.01</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$83.1	\$23.9	N/A	\$5.24
<u>Changes due to plan amendments</u>	—	—	—	—
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$83.1*</u>	<u>\$23.9*</u>	<u>N/A</u>	<u>\$5.24</u>

\* These amounts are based upon the revised valuation results.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 1(B)

Gains & Losses in Accrued Liabilities  
and Changes in Contribution Requirements  
During Calendar 1980

<u>Type of Activity</u>	<u>Accrued Liabilities (Gain) or Loss</u>		<u>Contribution Requirements (Gain) or Loss</u>	
	<u>Active Members</u> (\$ in 1,000)	<u>Retirants &amp; Beneficiaries</u> (\$ in 1,000)	<u>Normal Cost % of Payroll</u> (\$ in 1,000)	<u>\$ Payment on UAL</u> (\$ in 1,000)
<u>Age &amp; Service Retirements</u>	\$ (0.7)	\$ N/A	(0.40)%	\$(0.03)
<u>Disability &amp; Death-in-Service</u>				
a. <u>Disability</u>	(3.6)	N/A	0.04	(0.18)
b. <u>Death-in Service</u>	1.9	N/A	0.12	0.09
<u>Withdrawal</u>	9.7	N/A	(0.29)	0.47
<u>Salary Increases</u>	103.4	0.0		5.05
<u>Investment Income</u>	(14.2)	(8.1)		(1.09)
<u>Post Retirement Mortality</u>	N/A	10.5	N/A	0.51
<u>Contributions</u>	(16.1)	(10.6)		(1.30)
<u>Miscellaneous</u>	<u>0.0</u>	<u>0.0</u>	<u>    </u>	<u>0.00</u>
EXPERIENCE RELATED (GAIN)/LOSS & CORRESPONDING CHANGE IN CONTRIBUTION REQUIREMENTS	\$ 80.4	\$(8.2)	(0.53)%	\$ 3.52
<u>Conversion to UAL Amortization</u>			N/A	27.85
<u>Change in Funding Method For Death &amp; Disability</u>	37.0	N/A	0.92	1.81
<u>Changes due to plan amendments</u>	<u>681.6</u>	<u>    </u>	<u>5.36</u>	<u>33.26</u>
TOTAL (GAIN)/LOSS DURING YEAR	<u>\$799.0</u>	<u>\$(8.2)</u>	<u>5.75 %</u>	<u>\$66.44</u>

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 2(A)

Employees Active at Both Beginning & End of 1979

<u>Age Group Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
25-29	6	\$ 88,439	\$ 94,666	7.0%
30-34	5	74,097	79,099	6.8
35-39	10	151,912	162,722	7.1
40-44	6	101,860	111,004	9.0
45-49	1	17,575	18,776	6.8
50-54	3	63,911	69,437	8.6
55-59	<u>1</u>	<u>19,072</u>	<u>20,268</u>	6.3
TOTALS	32	\$516,866	\$555,972	7.6%

Employees Active at Either Beginning or End of 1979

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	0	1
1	0	0
2	0	0
3	6	0
4	1	6
5 or more	26	26

Average Age: 38.2 years.

Average Service: 12.6 years.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 2(B)

Employees Active at Both Beginning & End of 1980

<u>Age Group Beg. Year</u>	<u>No.</u>	<u>Beginning Salary</u>	<u>Ending Salary</u>	<u>% Increase In Salary</u>
25-29	6	\$ 92,106	\$100,343	8.9%
30-34	5	78,974	85,675	8.5
35-39	10	159,818	173,145	8.3
40-44	7	129,767	139,462	7.5
45-49	1	18,776	20,365	8.5
50-54	3	69,437	76,856	10.7
55-59	<u>1</u>	<u>20,268</u>	<u>22,004</u>	8.6
TOTALS	33	\$569,146	\$617,850	8.6%

Employees Active at Either Beginning or End of 1980

<u>Years Service</u>	<u>Beginning of Year</u>	<u>End of Year</u>
0	1	0
1	0	1
2	0	0
3	0	0
4	6	0
5 or more	26	32

Average Age: 39.2 years.

Average Service: 13.6 years.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 3(A)

Separations From Active Service (Other Than Age & Service Retirement)  
During 1979

<u>Age at Termination</u>	<u>Withdrawal</u>		<u>Disability</u>		<u>Death</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
20-24		*		*		*
25-29		0.1		*		*
30-34	1	0.1		*		*
35-39		0.2		0.1		0.1
40-44		*		*		*
45-49						*
50-54						*
TOTALS	1	0.4	0	0.1	0	0.1

\* Less than 0.1%

<u>Years Service at Termination</u>	<u>Actual</u>	<u>Expected</u>
0		
1		
2		
3		0.1
4		
5 or more	1	0.3
TOTALS	1	0.4

Average age at separation: 31.0 years.

Average service at separation: 8.8 years.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 3(B)

Separations From Active Service (Other Than Age & Service Retirement)  
During 1980

Age at Termination	Withdrawal		Disability		Death	
	Actual	Expected	Actual	Expected	Actual	Expected
25-29		0.1		*		*
30-34		0.1		*		*
35-39		0.2		*		*
40-44		*		0.1		0.1
45-49		*		*		*
TOTALS	0	0.4	0	0.1	0	0.1

\* Less than 0.1%

Years Service at Termination	Actual	Expected
0		
1		
2		
3		
4		0.1
5 or more		0.3
TOTALS	0	0.4

Average age at separation: N/A.

Average service at separation: N/A.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 4

Separations From Active Service  
For Age & Service Retirement

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<u>Age at Termination</u>	<u>1979</u>		<u>1980</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
59	—	—	—	1.0
TOTALS	0	0.0	0	1.0

Average age at retirement during period examined: N/A.

Average service at retirement during period examined: N/A.

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Schedule 5

Death After Retirement  
(Disability and Service Retirants)

<u>Age at Death</u>	<u>1979</u>		<u>1980</u>	
	<u>Actual</u>	<u>Expected</u>	<u>Actual</u>	<u>Expected</u>
50-54		0.0132		
55-59				0.0142
65-69		0.1225		0.0846
70-74		0.1013		0.1560
75-79		0.1674		0.0795
80-84	<u>—</u>	<u>—</u>	<u>—</u>	<u>0.1026</u>
TOTALS	0	0.4044	0	0.4369

Average age at death: N/A.

### Comments

The Contribution gain for 1980 reflects the inclusion of the contribution due for 1980 but unpaid of \$45,534.

APPENDICES

MOORHEAD FIRE DEPARTMENT RELIEF ASSOCIATION

Valuation Methods and Assumptions

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The Entry Age Normal Cost method was used to determine the normal cost of all benefits. Disability and death before retirement benefits were valued in previous valuations on a terminal funding basis (one year term cost).

The rate of investment return (interest) used in making the valuation was 5.0 percent per annum, compounded annually.

The mortality table used was the United States Life Table, 1959-61, White Males and White Females.

Sample Ages	Single Life Values: Present Value of \$1 Monthly				Future Life Expectancy (Years)	
	Level		Increasing		Men	Women
	For Life		3.5% Yearly			
	Men	Women	Men	Women		
45	\$169.61	\$186.84	\$263.23	\$304.86	27.33	32.52
50	154.85	174.20	229.51	270.80	23.22	28.08
55	139.29	159.62	197.24	236.11	19.45	23.81
60	122.79	142.73	166.26	200.76	16.01	19.69
65	106.31	124.22	137.82	166.16	12.97	15.88
70	89.86	104.31	111.71	132.82	10.29	12.38
75	73.39	83.92	87.66	101.94	7.92	9.28
80	57.54	64.24	66.29	74.77	5.89	6.67

Age & service retirement was assumed to occur at age 58, or attained age if older.

Sample Rates of Separation From Active Employment Before Retirement, Death or Disability

Sample Ages	% of Active Members Separating Within Next Year
20	3.00%
25	2.50
30	2.00
35	1.50
40	1.00
45	0.50
50+	0.00

Sample Pay Adjustment Factors used to Project Current Pays

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<u>Sample Ages</u>	<u>Present Pay Resulting in Pay of \$1,000 at Age 60</u>	<u>Percent Increase in Pay During Next Year</u>
20	\$ 253	3.5%
25	300	3.5
30	356	3.5
35	423	3.5
40	503	3.5
45	597	3.5
50	709	3.5
55	842	3.5
60	1,000	3.5

Disability retirements were assumed to occur as indicated below:

<u>Sample Ages</u>	<u>% of Active Members Becoming Disabled Within Next Year</u>
20	0.08%
25	0.08
30	0.08
35	0.08
40	0.20
45	0.26
50	0.49
55	0.89

Moorhead Fire Department Relief Association

Brief Summary (12-3-80) of Benefit Provisions Evaluated and/or Considered

Full Paid Firemen

Age & Service Retirement

Eligibility. 20 years of service and 55 years of age.

Amount. For first 20 years of service, 50% of "final average salary". For each year in excess of 20 an additional 2% is added up to a maximum of 80% at 35 years of service. The benefit is then increased by an amount equal to 3% of final average salary.

Final Average Salary means the average salary earned during the last 5 years of employment, on which contributions were made.

Disability Retirement

Eligibility. Totally and permanently disabled to the extent that no longer able to perform the duties of a firefighter before being eligible for age & service retirement.

Amount. Same as age & service benefit assuming 20 years of service and 50 years of age. If less than 5 years service, final average salary is based on actual service to the time of the disability.

Member's Death While Active, Or In Deferred Status, Or Retired

Eligibility.

Spouse. Legally married to member at separation from service and residing with member at time of death. Benefits terminate upon remarriage.

Child. Younger than age 18 or, if full time student, younger than 22.

Amount.

Spouse. 30% of Average Monthly Salary for six months preceding separation from service.

Child. 1/3 of spouse benefit per child.

Maximum Family Benefit. \$5,400 per year.

Vested Deferred. 10 years of service and separated before age 55. Payment beginning is deferred to attainment of eligibility for age & service retirement had active membership continued. Benefit of 2 1/2% of final average salary times years of service with maximum of 50% of final average salary.

Post Retirement Adjustments ("Escalator"). Benefit payments to retired members are increased each January by the lesser of the following percentages: (1) 3 1/2% or (2) the preceeding year's percentage increase in the salary of a first grade firefighter.

Member Contributions. 8% of salary. Total member contributions are refundable, with 3% interest, compounded annually, if no monthly benefit is payable upon separation from service. (No member contributions are made beyond 35 years of service.)

Funeral Expenses. \$1,000 lump sum payment upon death of active or retired member.

## Volunteer Firemen

### Age & Service Retirement

Eligibility. 20 years of service and 60 years of age.

Amount. \$576 per year.

### Disability Retirement

Eligibility. Totally and permanently disabled to the extent that no longer able to perform the duties of a firefighter before being eligible for age & service retirement. (Must be duty related.)

Amount. \$480 per year.

### Member's Death While Active, Or In Deferred Status, Or Retired

Eligibility. Same as full paid firemen.

Amount.

Spouse. \$480 per year.

Child. \$180 per year.

Funeral Expenses. \$500 lump sum payment upon death of active or retired member.

Vested Deferred. 4 years of service and separated before age 60. Payment beginning is deferred to attainment of age for eligibility for age & service retirement had active membership continued. Benefit is \$12 per year for each year of service with maximum of \$480 per year.

Post Retirement Adjustments ("Escalator"). Benefit payments to retired members are increased each January by the lesser of the following percentages: (1) 3 1/2% or (2) the preceding year's percentage increase in the salary of a first grade firefighter.

Member Contributions. \$1 per month for up to 20 years of service. No contributions for service beyond 20 years.